25 January 1956

MEMORANDUM FOR: Director Central Intelligence

THRU : Deputy Director Intelligence

SUBJECT : The Production of Primary Energy in the Sino-Soviet Bloc and in the Free World

1. This memorandum is in response to your request for information on the relative availability of primary energy in the Free World and the Sino-Soviet Bloc.

2. The attached data and corresponding graphics provide the basic information and comparisons requested.

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Research and Reports

Primary Energy Production in the Sino-Soviet Bloc and the Free World

Foreword

Primary energy is the quantity of energy produced from natural sources and made available for use, either directly or by processing. For this paper, primary energy is divided into 3 categories: (1) solid fuels, comprising coal, peat, oil shale, and firewood; (2) oil and gas, comprising crude oil, natural gas liquids, and natural gas; (3) hydroelectric power, comprising the electric power generated at the power site, available for transmission.

In order to aggregate these 3 categories of primary energy, the physical quantities in which they are reported have been converted to a common energy unit expressed as trillions of British thermal units, or BTUX 10^{12}.

Summary and Conclusions

In 1955 the USSR and the rest of the Sino-Soviet Bloc were largely dependent upon solid fuels for primary energy, while in the US and the rest of the Free World, oil and gas had become the dominant source of energy. Plans for 1960 in the USSR indicate a gradual transition to a relatively greater production of oil and gas. However, even if these plans are fulfilled, the oil and gas production in the USSR in 1960 will constitute only 24 percent of the oil and gas production forecast for the US in that year. The planned oil and gas production for the entire Sino-Soviet bloc in 1960 will comprise only 16 percent of that forecast for the Free World.

Hydroelectric power contributes a very small part of the total primary energy in the world. In 1955 it contributed 0.5 percent of the Sino-Soviet Bloc total and 2.0 percent of the Free World total. These shares will increase

Within the Sino-Soviet Bloc, the USSR is gradually becoming more dominant in the production of total primary energy, increasing from 59 percent of the Bloc total in 1950 to 62 percent planned for 1960. Conversely, the US is gradually declining in relative importance in the Free World, dropping from 54 percent in 1950 to a forecast of 50 percent in 1960.

Production

The distribution of the production of primary energy, by principal regions within the Sino-Soviet Bloc and in the Free World, is shown in Table 1. Comparative information from Table I is also shown graphically in Plates I and II.

Rates of Growth

The average annual rates of growth in Table 1 show large differences from country to country and among types of energy. As a whole the higher growth rates are associated with relatively low absolute outputs. For example, in the period 1951-55, Communist China showed the greatest annual growth rate in energy production, 14.8 percent, but from a very low base. In practically every case the average annual growth rate for oil and gas is substantially higher than for solid fuels.

From 1950 to 1955, primary energy production in the Sino-Soviet Bloc increased at an average annual rate of 7.9 percent as compared to 3.4 percent in the Free World. Approximately the same relationship will prevail during the 1956-60 period. In comparing growth rates it should be noted that the production of primary energy in the Free World is about 3 times that of the Sino-Soviet Bloc.

Nuclear Energy - USSR and US

In 1955 some electric power was produced by nuclear energy in both the USSR and the US, but the quantity in each case was negligible. Furthermore, it is not expected that by 1960 this source of energy will make an appreciable contribution to the total electric power output in either country.

The USSR has announced a goal of 2 to 2.5 million KW of nuclear energy capacity by 1960, which could yield as much as 20 billion KWH annually, depending upon various economic and technologic factors not yet evaluated. Announced US plans provide for only 0.8 million KW capacity by 1960, which is equivalent to about 5 billion KWH annual output. These quantities are quite insignificant when compared with present and planned production of electric power from conventional sources which are indicated in the following table.

	Billions of KWH	
	1955	1960
USSR	170	320
US	623	940

The development and production of nuclear materials requires large quantities of electric power. It is estimated that in 1955 the proportion of total electric power production devoted to the nuclear energy programs was 5 percent in the USSR compared to 10 percent in the US. Looking forward to 1960, it is likely that in the USSR the proportion will reach 7 to 10 percent, while that of the US is expected to remain at about 10 percent.

Table 1. Primary Energy Production for Selected Years and Growth Rates for Selected Periods
Sino-Soviet Bloc VS. Free World by Principal Regions and Categories

Trillions of BTU (BTUX 10^{12})

Item No.	Region and Category	1940 Production	1946 Production	Aver. Ann. Growth, % 1941-46	1950 Production	Aver. Ann. Growth, % 1947-50	1955 Production	Aver. Ann. Growth, % 1951-55	1960 Production (Plan or Forecast)	Aver. Ann. Growth, % 1956-60
I	Sino-Soviet Bloc a/									
1.	USSR - Total	7,016	6,198	-2.1	9,693	11.8	13,760	7.3	22,610	10.4
	a. Solid fuels	5,510	5,080	-1.4	7,770	11.2	10,230	5.7	15,030	8.0
	b. Oil and gas	1,490	1,100	-4.9	1,880	15.0	3,450	12.9	7,380	16.4
	c. Hydroelectric power	16	18	2	43	22	80	13	200	20
2.	European Satellites - Total	5,304	3,803	-5.4	5,383	9.1	7,604	7.1	9,930	5.5
	a. Solid fuels	4,960	3,450	-5.9	4,930	9.3	6,660	6.2	8,750	5.6
	b. Oil and gas	340	346	0.3	446	6.6	930	15.8	1,160	4.5
	c. Hydroelectric power	4	7	10	7	0	14	15	20	7
3.	Communist China b/	1,500	579	-14.7	1,244	21.1	2,476	14.8	3,820	9.1
	a. Solid fuels	1,490	560	-15.0	1,220	21.5	2,440	14.9	3,700	8.7
	b. Oil and gas	c/	4	d/	4	0	20	38	70	28.5
	c. Hydroelectric power	10	15	7	20	7	16	4	50	26
4.	Sino-Soviet Bloc - Total	13,820	10,580	-4.4	16,320	11.4	23,840	7.9	36,360	8.8
	a. Solid fuels	11,960	9,090	-4.5	13,920	11.2	19,330	6.8	27,480	7.3
	b. Oil and gas	1,830	1,450	-3.2	2,330	12.6	4,400	13.5	8,610	14.4
	c. Hydroelectric power	30	40	5	70	15	110	9.5	270	19.7
II	Free World									
1.	US - Total	24,810	31,210	3.9	34,320	2.4	38,520	2.3	44,900	3.1
	a. Solid fuels	13,580	15,810	2.6	14,860	-1.5	13,020	-2.6	14,020	1.5
	b. Oil and gas	11,020	15,080	5.4	19,070	6.0	25,050	5.6	30,400	3.9
	c. Hydroelectric power	210	320	7.3	390	5.1	450	2.9	480	1.3
2.	Free World less US - Total	24,000	21,400	-1.9	29,310	8.2	36,760	4.6	45,620	4.4
	a. Solid fuels	20,220	15,750	-4.1	19,060	4.9	20,210	1.2	21,350	1.1
	b. Oil and gas	3,330	5,190	7.7	9,580	16.6	15,490	10.1	22,700	7.9
	c. Hydroelectric power	450	460	0.4	670	9.9	1,060	9.6	1,570	8.2
3.	Free World - Total	48,810	52,610	1.3	63,630	4.9	75,280	3.4	90,520	3.8
	a. Solid fuels	33,800	31,560	-1.1	33,920	1.8	33,230	-0.4	35,370	1.3
	b. Oil and gas	14,350	20,270	5.9	28,650	9.0	40,540	7.2	53,100	5.5
	c. Hydroelectric power	660	780	2.8	1,060	8.0	1,510	7.3	2,050	6.3
III	[illegible]									
1.	Sino-Soviet Bloc/Free World	28.3	20.1		25.6		31.7		40.2	
2.	USSR/US	28.3	19.9		28.2		35.7		50.4	

a. For 1940 and 1946, data cover same countries as in 1950, 1955 and 1960.
b. Includes North Korea, Outer Mongolia and Viet Minh.
c. Less than 0.5 trillion BTU.
d. Not computed.